Claims

[c1]   1.A method for segmenting three-dimensional (3D) medical images containing an object of interest comprising:

generating a plurality of successive layers of fixed radius spheres about a circumference of a sphere containing at least one seed point placed within the object of interest when a plurality of respective voxels contained within the spheres exceed a selected threshold; and,

repeating generation of the layers until no further voxels contained within an outer surface of each respective layer exceed the selected threshold, the layers forming a segmented representation of the object of interest.

[c2]   2.The method of claim 1 wherein the radius is selected in accordance with a desired radius of curvature of the segmented representation.

[c3]   3.The method of claim 1 wherein the layers of spheres within the segmented representation of the object is wholly contained within the object of interest.

[c4]   4.The method of claim 1 wherein the three-dimensional images are acquired by at least one of magnetic resonance imaging (MRI), computed tomography (CT), positron emission tomography (PET), and x-ray systems.

[c5]   5.A method for segmenting three-dimensional medical images containing an object of interest comprising:

placing at least one seed point in the object of interest;

generating at least one spherical wavelet having a selected radius about the seed point;

comparing a plurality of voxels contained with the wavelet with a selected threshold;

generating a plurality of additional spherical wavelets circumferentially about the wavelet when the plurality of voxels exceed the selected threshold; the plurality of spherical wavelets having an advancing surface about an outside circumference;

repeating the comparing and generating steps for each of the plurality of voxels contained within the additional spherical wavelets on the advancing surface to generate layers of spherical wavelets to form a segmented representation of the

object of interest, the repeating step ending when no further voxels contained within the advancing surface exceed the selected threshold.

[c6]   6.The method of claim 5 wherein the radius is selected in accordance with a desired radius of curvature of the segmented representation.

[c7]   7.The method of claim 5 wherein the three-dimensional images are acquired by at least one of magnetic resonance imaging (MRI), computed tomography (CT), positron emission tomography (PET), and x-ray systems.

[c8]   8.A method for segmenting three-dimensional (3D) medical images containing an object of interest comprising:
placing at least one start seed point within the object of interest;
placing at least one stop seed point outside the object of interest;
generating successive layers of spheres about a circumference of a sphere containing at the least one start seed point when a plurality of respective voxels contained within the spheres exceed an selected initial threshold;
repeating generation of the layers until no further voxels contained within an outer surface of each respective layer exceed the selected initial threshold or until the at least one stop seed is encountered to form a segmented representation of the object of interest; and,
adjusting the selected threshold in response to encountering the stop seed point.

[c9]   9.The method of claim 8 wherein the spheres have a selected radius based on desired radius of curvature.

[c10]   10.The method of claim 8 wherein the three-dimensional images are acquired by at least one of magnetic resonance imaging (MRI), computed tomography (CT), positron emission tomography (PET), and x-ray systems.

[c11]   11.The method of claim 8 wherein the adjusting step is performed with a binary search and the selected initial threshold is an average of a minimum and maximum intensity of the object.

[c12]
12.A system for segmenting medical images acquired by an image acquisition

device comprising:

a processor coupled to the image acquisition device, the processor is adapted to perform segmentation computations and the segmentation computations comprise:

generating a plurality of successive layers of fixed radius spheres about a circumference of a sphere containing at least one seed point placed within the object of interest when a plurality of respective voxels contained within the spheres exceed a selected threshold;

the processor being further adapted to repeat generation of the layers until no further voxels contained within an outer surface of each respective layer exceed the selected threshold, the layers forming a segmented representation of the object of interest; and,

an interface unit coupled to the processor adapted to present information relating to the segmented representation.

[cl3]   13.The system of claim 12 wherein the processor is further adapted to adjust the selected threshold in response to encountering a stop seed point.

[cl4]   14.The system of claim 12 wherein the interface unit is further adapted to receive seed point data from a user of the system.

[cl5]   15. The system of claim 12 wherein the spheres have a selected radius based on ·desired radius of curvature.

[cl6]   16.The system of claim 12 wherein the image acquisition device is at least one of magnetic resonance imaging (MRI), computed tomography (CT), positron emission tomography (PET), and x-ray systems.